

stations are received during the hurricane season, and advices regarding disturbances are prepared for transmittal to the various islands of the West Indies. The observational data thus collected are promptly telegraphed to the Central Office of the Weather Bureau at Washington, D. C., together with warnings or advices that may have been issued.

The West Indian observation stations, which are regularly equipped and officered by the Weather Bureau, number thirteen, and provision has been made for ordering and displaying, through these stations, hurricane warnings at more than one hundred points in the West Indies. The distribution of hurricane information and advices throughout the West Indies is limited only by the telegraphic and messenger services possessed by the several islands.

During the summer of 1899 reports by telegraph were begun from well-distributed Mexican stations. These reports are furnished through the cooperation and courtesy of the Director General of the federal telegraph lines of Mexico, who delivers them (free of expense to the United States) to the official in charge of the Weather Bureau office at Galveston, Tex., who, in turn, promptly transmits them by telegraph to Washington. Credit for arranging the plan of exchange of meteorological reports between the United States and Mexico is in a large measure due to Dr. I. M. Cline, official in charge of the Weather Bureau office at Galveston.

The Central Office of the Weather Bureau at Washington now has for its consideration reports from an area which extends from the South American coast to northern Canada, a region whose extreme limits cover latitude 11° to 53° north, and longitude 60° to 125° west, or more than 42° of latitude and 65° of longitude.

The advantage afforded by this great area of telegraphic observations can scarcely be estimated. By means of the West Indian reports the tropical storms which cross the more eastern islands of that group can be detected almost in their inception. They can be traced day by day, and the probable time of their arrival at any point in their line of advance can be forecast.

By means of the Mexican Gulf coast reports the development of storms near the Yucatan and Mexican coasts can be detected, and the course of West Indian storms which cross the Gulf of Mexico can be determined. These reports furnish information which render possible warnings of the severe cold waves and northerly gales which visit the Gulf districts of Mexico during the winter months. It is believed that the reports received from northern and western parts of Mexico will lead to a better understanding of the important storms which sweep northeastward from the tropical Pacific over northern Mexico and cross the United States from the Rio Grande and southern Rocky Mountain districts to the Atlantic.

Reports from the extreme British Northwest Territory, which have been added within the last two years, have furnished valuable data regarding the movements of north Pacific storms, and will contribute to present knowledge of the mechanism of the severe cold waves which appear in that region.

The extensions referred to constitute one of the most substantial advances in the history of the Weather Bureau. The telegraphed reports afford daily and twice daily meteorological surveys of the populated parts of North America and a great part of Central America and adjacent waters, by means of which weather changes and conditions calculated to benefit or injure maritime or commercial interests can be foreseen. And it is believed that each extension of the area of observation brings nearer that desideratum of meteorologists—long range forecasts. When this area shall have been extended to even partly include the great oceanic permanent cyclones and anticyclones the science of mete-

orology will advance from a knowledge of effects to a more perfect understanding of one of the causes thereof.

OBSERVATIONS AT HONOLULU.

Through the kind cooperation of Mr. Curtis J. Lyons, Meteorologist to the Government Survey, the monthly report of meteorological conditions at Honolulu is now made partly in accordance with the new form, No. 1040, and the arrangement of the columns, therefore, differs from those previously published.

Meteorological observations at Honolulu, June, 1900.

The station is at 21° 18' N., 157° 50' W.
Hawaiian standard time is 10^h 30^m slow of Greenwich time. Honolulu local mean time is 10^h 31^m slow of Greenwich.
Pressure is corrected for temperature and reduced to sea level, and the gravity correction, -0.06, has been applied.
The average direction and force of the wind and the average cloudiness for the whole day are given unless they have varied more than usual, in which case the extremes are given. The scale of wind force is 0 to 12, or Beaufort scale. Two directions of wind, or values of wind force or amounts of cloudiness, connected by a dash, indicate change from one to the other.
The rainfall for twenty-four hours has always been measured at 9 a. m. local or 7:31 p. m. (not 1 p. m.), Greenwich time, on the respective dates.
The rain gage, 8 inches in diameter, is 1 foot above ground. Thermometer, 9 feet above ground. Ground is 43 feet, and the barometer 50 feet above sea level.

Date.	Pressure at sea level.		Temperature.		During twenty-four hours preceding 1 p. m. Greenwich time, or 2:30 a. m., Honolulu time.							Total rainfall at 9 a. m. local time.	
	Dry bulb.	Wet bulb.	Temperature.		Means.		Wind.		Average cloudiness.	Sea-level pressures.			
			Maximum.	Minimum.	Dew-point.	Relative humidity.	Prevailing direction.	Force.		Maximum.	Minimum.		
1.....	29.96	73	68.5	83	72	64.5	67	ne.	3	3	30.01	29.95	0.05
2.....	29.97	73	67.5	82	72	66.0	71	ne.	4	3	30.00	29.94	0.03
3.....	29.97	69	67.5	83	72	65.0	67	ne.	4-1	5	30.03	29.94	0.08
4.....	30.00	67	64	83	68	65.3	72	ene.	1-5	5-2	30.03	29.95	0.00
5.....	29.99	68	66	83	67	64.7	70	ne.	3	3	30.05	29.98	0.00
6.....	30.00	74	69	85	67	67.7	78	sw-n.	2-4	1-4	30.04	29.97	0.00
7.....	29.99	74	67.5	85	72	66.8	66	ne.	3	1	30.04	29.96	0.00
8.....	30.00	75	69	85	69	64.5	65	ne-nne.	3	1	30.04	29.95	0.00
9.....	30.03	72	67	85	73	64.7	63	ne.	3	2-5	30.06	30.00	0.00
10.....	29.97	67	64.5	84	72	64.0	66	ne.	4-1	3-1	30.05	29.96	0.00
11.....	29.94	71	67	85	67	62.3	65	nne.	3-0	1-0	30.01	29.94	0.00
12.....	29.91	71	69	86	69	67.0	72	ne.	2-0	4	29.97	29.88	0.05
13.....	29.87	74	70.5	92	70	68.0	78	ne.	3	5	29.92	29.86	0.00
14.....	29.92	75	69	93	72	67.7	71	ene.	3	5	29.94	29.86	0.00
15.....	29.94	76	68.5	86	74	65.5	64	nne.	3-4	1-4	29.98	29.90	0.00
16.....	29.98	75	68.5	85	75	66.0	65	ne.	4	2-5	30.01	29.96	0.06
17.....	29.98	77	70.5	85	74	65.5	64	ene.	4	3	30.01	29.96	0.01
18.....	30.00	76	69	86	76	67.0	65	ne.	3	3	30.02	29.95	0.01
19.....	30.03	72	67	86	73	63.7	60	nne.	3	1-0	30.06	29.98	0.00
20.....	30.03	75	68	86	70	63.5	62	ne.	3	3-1	30.08	30.02	0.00
21.....	30.05	76	68.5	85	70	64.3	62	ne.	3	3	30.07	30.00	0.00
22.....	30.02	75	69.5	86	75	65.5	63	ne.	3	3-6	30.09	29.99	0.00
23.....	30.01	75	72.5	88	75	67.3	66	ne.	2	1-4	30.07	29.99	0.04
24.....	30.02	77	69.5	84	75	70.3	78	ne.	2	5	30.07	30.00	0.00
25.....	30.02	74	70	86	75	65.7	64	ne.	2	1	30.07	29.99	0.04
26.....	29.99	76	68	85	73	68.0	73	nne.	1-3-0	3-1-7	30.05	29.98	0.03
27.....	29.98	75	70.5	85	72	65.7	67	ne.	2-5	3	30.04	29.98	0.40
28.....	29.97	76	70	82	72	68.3	76	ne.	2-4	7-3	30.02	29.96	0.05
29.....	29.97	77	70	84	75	68.0	73	ne.	4	3	30.01	29.94	0.01
30.....	29.99	77	70	85	77	67.0	65	ne.	3.5	3	30.03	29.96	0.02
Sums..													0.88
Means.	29.983	73.7	68.3	84.7	72.2	66.0	68.0	3.0	3.1	30.029	29.956
Departure..	-0.02					+0.5	-2.6	-0.9				-0.72

Mean temperature for June, 1900 (6+2+9)+8=77.6°; normal is 75.9°. Mean pressure for June (9+8)+2 is 29.991; normal is 30.012.

*This pressure is as recorded at 1 p. m., Greenwich time. †These temperatures are observed at 6 a. m., local, or 4:31 p. m., Greenwich time. ‡These values are the means of (6+9+2+9)+4. §Beaufort scale.

RAINFALL AND DRAINAGE IN THE UPPER CHAGRES RIVER.

By GEN. HENRY L. ABBOT, dated July 10, 1900.

During the past year the matter of rainfall and drainage on the Isthmus of Panama has received special study. The following results are translated from my original paper compiled for the Compagnie Nouvelle and are communicated to the MONTHLY WEATHER REVIEW as being of general interest.